

**INDIANA DEPARTMENT OF TRANSPORTATION  
OFFICE of MATERIALS MANAGEMENT**

**CONTRACTOR QUALITY CONTROL PLANS  
ITM No. 803-11P**

**1.0 SCOPE.**

- 1.1** This procedure covers the preparation of a QCP by a Contractor. The QCP shall be provided, maintained, and followed to assure all materials furnished and placed for acceptance are in accordance with the contract requirements.
- 1.2** The values stated in either acceptable English or SI metric units are to be regarded separately as standard, as appropriate for a specification with which this ITM is used. Within the text, SI metric units are shown in parenthesis. The values stated in each system may not be exact equivalents; therefore, each system shall be used independently of the other, without combining values in any way.
- 1.3** This ITM may involve hazardous materials, operations, and equipment and may not address all of the safety problems associated with the use of the test method. The user of the ITM is responsible for establishing appropriate safety and health practices and to determining the applicability of regulatory limitations prior to use.

**2.0 REFERENCES.**

- 2.1 Standards.** AASHTO, ASTM, ITM, SSPC, and other referenced standards shall be identified under each type of Contractor's QCP contained herein.

**3.0 TERMINOLOGY.** Definitions for terms and abbreviations shall be in accordance with the Department's Standard Specifications, Section 101. Specific terms and abbreviations to a type of Contractor's QCP shall be defined within that type of QCP requirements, as necessary.

**4.0 GENERAL REQUIREMENTS.**

- 4.1** The QCP shall be contract specific and state how the Contractor proposes to control the materials, equipment, and operations on the contract.
- 4.2** The QCP shall be signed and dated by the Contractor's representative at the time the QCP is submitted to the Engineer.
- 4.3** The Department will review, sign, and date the QCP if the contents of the QCP are in compliance with the requirements as stated herein.

- 4.4** The QCP shall be maintained to reflect the current status of the operations, and revisions shall be provided in writing prior to initiating the change. The change shall not be implemented until the revision has been accepted.
- 4.5** The QCP shall contain the name, qualifications, telephone number, duties, and employer of all quality control personnel necessary to implement the QCP. The minimum number of quality control functions shall be as follows:
  - 4.5.1** QCP Manager. The person responsible for the overall administration of the QCP
  - 4.5.2** QCP Field Manager. The person responsible for the execution of the QCP and liaison with the Engineer. The QCP Field Manager for HMA Pavements shall be a Certified HMA Field Supervisor. The QCP Field Manager for PCCP shall be a Certified PCCP Field Supervisor.
  - 4.5.3** Quality Control Technician. The person responsible for conducting quality control tests and inspection to implement the QCP. There may be more than one quality control technician.
  - 4.5.4** One quality control person may perform the duties of any of the other functions listed in 4.5.1, 4.5.2, or 4.5.3.
- 4.6** The QCP shall contain, but not be limited to, the proposed methods of sampling, testing, calibration, construction control, monitoring, and anticipated frequencies.
- 4.7** Placement operations shall not begin before the QCP has been accepted.
- 4.8** As a minimum, the QCP shall contain the information as stated herein for the following operations:
  - 4.8.1** HMA Pavements -- 5.0
  - 4.8.2** Portland Cement Concrete Pavements -- 6.0
  - 4.8.3** Structural Concrete -- 7.0
  - 4.8.4** Field Painting of Steel Bridges -- 8.0
  - 4.8.5** Shop Painting of Steel for Bridges -- 9.0
  - 4.8.6** Seal Coat -- 10.0
  - 4.8.7** Micro-Surfacing -- 11.0
  - 4.8.8** Trenchless Pipe Installation -- 12.0

## **5.0 HMA PAVEMENTS QCP.**

### **5.1 References.**

#### **5.1.1 AASHTO Standards.**

TP 68 Density of In-Place Hot Mix asphalt (HMA) Pavement by  
Electronic Surface Contact Devices

#### **5.1.2 ASTM Standards.**

D 2950 Density of Bituminous Concrete in Place by Nuclear Method

#### **5.1.3 ITM Standards.**

580 Sampling HMA  
583 Certified Hot Mix Asphalt Producer Program  
812 Macrotexture of Milled Pavement  
912 Profilographs

**5.2 Quality Control Technician.** The quality control technician shall be responsible for the following minimum functions.

**5.2.1** Quality control tests for temperature, density, and smoothness

**5.2.2** Pavement samples for Contractor's quality control and Department acceptance

**5.3 Milling.** The procedures for milling the existing material shall include as a minimum the following:

**5.3.1** Milling Plan. The general procedures for asphalt milling, asphalt removal, PCCP milling, scarification and profile milling, and transition milling.

**5.3.2** Equipment. A description of the equipment required to mill, cut, and remove the existing material.

**5.3.3** Testing. The procedure for measuring the macrotexture of the milled surface in accordance with ITM 812. The minimum frequency of tests shall be one test per day.

The procedure, frequency, and equipment for measuring the cross-slope and longitudinal surface finish of the milled material shall be included.

- 5.4 Process Balance.** The methodology for balancing the operation, to include plant production, transportation, placement, and compaction. The corrective action procedure for keeping the total operation in balance shall be provided.
- 5.5 Transportation of Mixture.** The procedures for transportation of the HMA from the plant to the paver shall include as a minimum the following:
  - 5.5.1 Truck Bed Cover.** The criteria for when waterproof covers shall be used and the person responsible for directing the use of the waterproof covers
  - 5.5.2 Unloading.** The procedures for truck unloading, and for removing the remaining mixture from the truck bed and bed apron
  - 5.5.3 Transfer Vehicles.** If used, the type and size of Materials Transfer Device or Windrow Elevator, and the plans for bridge crossings
- 5.6 Paving.** The procedures for placement of the HMA shall include as a minimum the following:
  - 5.6.1 Equipment.** The manufacturer's make, model, serial number, manufactured year, and the manufacturer's literature with pictures of the paver(s) that shall be used
  - 5.6.2 Paving Plan.** The general sequence, the widths and depths of paving for each of the major courses, and the planned date for paving to begin and to be completed on the contract
  - 5.6.3 Material Feed System.** The procedure for processing the mixture through the paver
  - 5.6.4 Grade and Slope.** The procedure for controlling the grade and slope, including a description of placing wedge and level courses, if applicable
  - 5.6.5 Joints.** The procedure for the construction of the longitudinal and transverse joints. The starting and stopping procedures of the paver for transverse joints shall be included.
  - 5.6.6 Asphalt Materials.** The source, source numbers, type, and grade of materials that shall be used for the tack coat, prime coat, or seal coat.
- 5.7 Joint Compaction.** The procedures for compaction of the longitudinal and transverse joints

**5.8 Materials Sampling and Testing.** The procedures for sampling and testing of the HMA and the frequency of tests shall be identified and include as a minimum the following:

**5.8.1 Mixture Properties.** The plant, certified in accordance with ITM 583 that shall supply the HMA mixture to the site including the location, owner, producer name, and plant number

**5.8.2 Mixture Temperature at Paver.** The procedure for measuring the temperature of the mixture at the paver. The temperature shall be taken immediately behind the paver prior to compaction. The minimum frequency of tests shall be one test for each 1 h of paving.

**5.8.3 Density.** The procedure for measuring the density of the mixture utilizing a non-destructive technique. Density tests shall be taken on the mainline and shoulders. The minimum frequency of tests shall be one test each 1000 yd<sup>2</sup> (800 m<sup>2</sup>). A nuclear test device, if used, shall be calibrated in accordance with ASTM D 2950 at a minimum frequency of once each 12 months.

The procedure for monitoring the temperature of the mix during compaction to optimize the rolling pattern shall be included.

**5.8.4 Coring.** The plan for when cores shall be taken and procedure for refilling core holes

**5.8.5 Smoothness.** The procedure for measuring the smoothness of the pavement. The annual certification of the profilograph in accordance with ITM 912 shall be included.

**5.9 Response to Test Results.** The response to quality control tests shall include as a minimum the following.

**5.9.1 Mixture.** The procedure for corrective action in response to mixture tests from the pavement

**5.9.2 Temperature of Mixture.** The procedure for corrective action in response to temperature measurements

**5.9.3 Density.** The procedure for corrective action in response to density tests

**5.10 Pavement Smoothness.** The procedure for correcting the profile of non-complying pavement. Areas outside of the allowable Standard Specification tolerance shall be corrected.

**5.11 Documentation.** A statement that the test results for control and documentation of equipment shall be maintained for a period of three years upon completion of the contract shall be included. The records, either electronic and/or hard copies, shall be maintained at a readily accessible location for review by the Department at any time. The documentation shall include the following:

**5.11.1 Quality Control Tests.** The results for the mixture, temperature, density, and smoothness tests of the pavement

**5.11.2 Equipment.** Documentation of the manufacture, model, and type of paver and rollers used each day of paving. Modifications to this equipment shall be noted.

## **6.0 PORTLAND CEMENT CONCRETE PAVEMENT QCP.**

### **6.1 References.**

#### **6.1.1 AASHTO Standards.**

T 121 Mass per Cubic Meter (Cubic Foot), Yield, and Air Content (Gravimetric) of Concrete

T 152 Air Content of Freshly Mixed Concrete by the Pressure Method

T 309 Temperature of Freshly Mixed Hydraulic Cement Concrete

#### **6.1.2 ASTM Standards.**

C 173 Air Content of Freshly Mixed Concrete by the Volumetric Method

#### **6.1.3 ITM Standards.**

402 Strength of Portland Cement Concrete Pavement (PCCP) Using the Maturity Method

901 The Proper Use of the Profilograph and the Interpretation of Profilograms

902 Verifying Sieves

909 Verifying Thermometers

910 Verifying Balances

911 Verifying Slump Cones

#### **6.1.4 Other.**

ACI 306 Cold Weather Concreting

**6.2 Quality Control Technician.** The technician shall be an American Concrete Institute (ACI) certified concrete field testing technician, grade 1.

**6.3 Testing Facility.** The location of the testing facility and a list of test equipment. The testing facility shall be in accordance with 508.09. A statement of accessibility of the testing facility shall be included that allows Department personnel to witness quality control activities, and to review quality control tests.

**6.3.1 Testing Equipment.** A list of the testing equipment proposed for quality control testing, and the test methods and frequency of calibration or verification of the equipment. The equipment shall meet the requirements of the test methods identified in 508.09. The Contractor shall maintain a record of all equipment calibration or verification results at the testing facility. The minimum frequency and procedures shall be as follows:

Equipment	Requirement	Minimum Frequency	Procedure
Air Meter	Calibration	3 months	AASHTO T 152 or ASTM C173
Balances	Verification	12 months	ITM 910
Sieves	Check Physical Condition	12 months	ITM 902
Slump Cones	Verify Dimensions	12 months	ITM 911
Thermometers	Verification	12 months	ITM 909
Unit Weight Measure	Calibration	12 months	AASHTO T 121

**6.4 Materials.** The source, transportation, handling, and storage procedures, as applicable, for materials to be used in the PCCP.

**6.4.1** Admixtures - type

**6.4.2** Aggregates - size

**6.4.3** Curing Materials

**6.4.4** Dowel Bars - size

**6.4.5** Dowel Bar Assemblies - size

**6.4.6** Fly Ash - class

**6.4.7** Ground Granulated Blast Furnace Slag - grade

**6.4.8** Joint Fillers - type

**6.4.9** Joint Materials – type

**6.4.10** Portland Cement - type

**6.4.11** Reinforcing Steel - size and type

**6.4.12** Water - Potable or non potable. If non-potable, the sampling and testing procedures shall be included.

**6.5 Process Control of Aggregates.** A plan for control of the gradation and moisture in the aggregate stockpiles, identification of stockpiles by signing or other acceptable methods, techniques for construction of proper stockpiles, and loading procedures.

**6.5.1** The gradation control band tolerances on each sieve for aggregates not in accordance with the gradations of 904.02 and 904.03 shall be included.

Gradation tests for each aggregate size shall be conducted daily when concrete paving operations exceed 200 yd<sup>2</sup> (200 m<sup>2</sup>) per day. The procedure for determination of the combined aggregate gradation shall be included. Gradation tests shall verify the maximum size of the aggregates and the mathematically combined amount passing the No. 200 (75 µm) sieve of fine and coarse aggregates which have been proportioned in accordance with the CMD. Gradation tests shall also verify compliance with intermediate sieves in accordance with 904.02 and 904.03 or with sieve band tolerances as stated herein.

**6.5.2** The procedure for determination of the water absorption of the aggregate shall be included. The minimum frequency shall be two tests for each aggregate used during the concrete paving operations.

**6.6 Trial Batch Demonstration.** The procedures, location, and type of equipment to be utilized during the trial batch demonstration(s). The identification and intended use of each mixture shall be included.

**6.7 Concrete Batching.** The techniques and controls of the concrete batching operations. A description of the plant, including the capacity and intended batch size, and the methods and sequence by which the plant produces a batch shall be included. The minimum mixing time shall be stated.

The initial and routine equipment checks, including those conducted on mixers, scales, water meters, and admixture dispensers, shall be included. All material checks, including frequencies of testing, shall be identified. The methods to monitor ingredients used, and the record of each batch shall be included.



- 6.8 Process Control of Concrete.** The procedures for sampling and testing the concrete mix for flexural strength, air content, unit weight, water/cementitious ratio, and temperature. The frequency of tests shall be included and as a minimum shall meet the following:
- 6.8.1 Flexural Strength.** The minimum frequency of tests shall be one set of two beams for each subplot.
  - 6.8.2 Air Content.** The minimum frequency of tests shall be one air content for each subplot.
  - 6.8.3 Unit Weight.** The minimum frequency of tests shall be one unit weight for each subplot.
  - 6.8.4 Water/Cementitious Ratio.** The minimum frequency shall be one per week or one for every five lots, whichever is more restrictive by frequency.
  - 6.8.5 Concrete Temperature at Paver.** The minimum frequency of tests shall be one concrete temperature test for each 2h of paving.
- 6.9 Process Control of Pavement.** The procedures for determining the pavement depth, surface profile, and surface smoothness shall be as follows:
- 6.9.1 Pavement Depth.** The procedure for monitoring the depth of the concrete pavement
  - 6.9.2 Surface Profile.** The procedure for measuring the surface profile and correcting profile non-compliance of the concrete pavement
  - 6.9.3 Surface Smoothness.** The procedure for measuring the smoothness and correcting smoothness non-compliance of the concrete pavement. The certification of the profilograph in accordance with ITM 901 shall be included.
- 6.10 Control Charts.** The procedures for charting quality control results for tests for flexural strength, unit weight, and air content of the concrete. The control charts shall indicate process control limits for each subplot and lot, 100 percent payment limits, and have a legend. The charts shall be maintained at a readily accessible location at the common testing facility. The control chart legend shall be as follows:
- 6.10.1** The target value, if applicable, shall be the center of the chart and shall be represented by a heavy long dash followed by a short dash line.
  - 6.10.2** Control limits shall be represented by heavy solid lines.

- 6.10.3 One hundred percent payment limits shall be indicated by short dashed lines.
- 6.10.4 The horizontal lines on the chart indicating the 100 percent payment limits, control limits, and target value, if applicable, shall be numerically identified in the left margin.
- 6.10.5 The vertical distance between upper and lower control limits shall be no less than 2 in. (50 mm).
- 6.10.6 The plot point for the test results shall be surrounded by a small circle, and each consecutive point shall be connected by a solid straight line.
- 6.10.7 Test results shall be plotted left to right in chronological order, and dates corresponding to each test shall be shown along the horizontal axis.

Any proposed deviation from these procedures shall be identified in the QCP.

- 6.11 **Response to Test Results.** The response to process control tests shall include as a minimum the following:
  - 6.11.1 **Water Absorption.** The procedure for corrective action when the absorption test results for a particular size of aggregate differs from the design mix value by more than 0.5 percent. A statement that production shall be discontinued when this tolerance is exceeded shall be included.
  - 6.11.2 **Other Quality Control Tests.** The procedure for corrective action for results outside of satisfactory limits for each type of test.
- 6.12 **Concrete Hauling.** The equipment and methods for delivery to the paver. The description or plan drawing of the traffic patterns in the vicinity of the plant and for delivery of the concrete mix to the site of work shall be stated. Information concerning temporary adjustments to traffic flow shall be included. When using transit mixers, the procedures for adding water to the PCC and the required mixing time to increase workability shall be included.
- 6.13 **Concrete Paving.** The procedures for placement of the concrete shall include as a minimum the following.
  - 6.13.1 **Paving Plan.** The general sequence of construction, the widths and methods of placement for all areas, and the planned date for paving to begin and to be completed on each phase of the contract

- 6.13.2 Cold Weather Paving.** The procedures to be utilized when ambient temperature is below 35°F (2°C). Procedures shall address protection of subgrade, treatment of concrete components, and protection of the PCCP. ACI 306 may be used for additional guidance.
- 6.13.3 Night Paving.** The procedures to be utilized for artificial lighting when natural light is insufficient. The procedures shall include the number and type of units with respect to the paving operations.
- 6.13.4 Paving.** The techniques used to place concrete throughout the project with specific details pertaining to difficult locations, such as joining existing pavement, gaps, headers, crossovers, approaches, or tapers
- 6.13.5 Equipment.** Identification of the equipment used in the paving operations on each phase of the contract
- 6.13.6 Alignment and Profile.** The methods of controlling the alignment and profile
- 6.13.7 Placement and Consolidation.** Methods of depositing plastic concrete from the hauling equipment to the grade. The proposed methods of spreading and consolidating shall be included.
- 6.14 Joints.** The type of sealant to be used and the manufacturers recommended installation procedure for each type of joint construction. The measures to be taken to prevent the flow of cementitious material into previously placed and sawn joints, when placing adjacent concrete pavement shall be included.
  - 6.14.1 D-1 Contraction.** The procedure for identifying the contract conditions so that the joints are continuous from edge of pavement to edge of pavement. Methods of installation, alignment, timing of sawing, and protection shall be included.
  - 6.14.2 Longitudinal.** The method of construction, which shall include details of how the reinforcing steel is to be placed and when the joints are to be saw cut, at identified planned locations
  - 6.14.3 Transverse Construction.** The method of construction, which shall include details of the type of header and reinforcing used, when paving operations are suspended
  - 6.14.4 Longitudinal Construction.** The method of construction and proposed spacing if other than shown on the plans

**6.15 Finishing, Texturing, and Curing.** The methods for finishing, texturing, and curing the PCCP. The equipment to be used shall be identified.

**6.16 Documentation.** A statement that the test results for control shall be maintained for a period of three years upon completion of the contract shall be included. The records, either electronic and/or hard copies, shall be maintained at a readily accessible location for review by the Department at any time. The documentation shall include results for the aggregate tests, mixture tests, and the profile, smoothness, and depth of pavement tests.

## **7.0 STRUCTURAL CONCRETE QCP.**

### **7.1 References.**

#### **7.1.1 AASHTO Standards.**

- T 67 Standard Practices for Force Verification of Testing Machines
- T 121 Mass per Cubic Meter (Cubic Foot), Yield, and Air Content (Gravimetric) of Concrete
- T 152 Air Content of Freshly Mixed Concrete by the Pressure Method

#### **7.1.2 ASTM Standards.**

- C 173 Air Content of Freshly Mixed Concrete by the Volumetric Method

#### **7.1.3 ITM Standards.**

- 902 Verifying Sieves
- 909 Verifying Thermometers
- 910 Verifying Balances
- 911 Verifying Slump Cones

**7.2 Quality Control Technician.** The technician shall be a Certified Concrete Technician. The technician shall be at the plant for the trial batch demonstration, and be at the plant or at the site of work at the point of placement until placement and finishing are complete. The technician shall supervise all sampling and testing for process control. An American Concrete Institute (ACI) certified concrete field testing technician, grade I, shall perform all sampling and testing for process control.

**7.3 Testing Facility.** The location of the testing facility to be used for determination of the compressive strength of concrete

- 7.4 Testing Equipment.** A list of the testing equipment proposed for process control testing, and the test methods and frequency of calibration or verification of the equipment. The equipment shall meet the requirements of the test methods identified, except as such requirements may be modified in the Standard Specifications. A record of all equipment calibration or verification results shall be maintained. The minimum frequency and procedures shall be as follows:

Equipment	Requirement	Minimum Frequency	Procedure
Air Meter	Calibration	3 months	AASHTO T 152 or ASTM C 173
Balances	Verification	12 months	ITM 910
Sieves	Check Physical Condition	12 months	ITM 902
Slump Cones	Verifying Dimensions	12 months	ITM 911
Testing Machine	Verification	12 months	AASHTO T 67
Thermometers	Verification	12 months	ITM 909
Unit Weight Measures	Calibration	12 months	AASHTO T 121

- 7.5 Materials.** The source, transportation, handling, and storage procedures, if applicable, for materials to be used in the Superstructure Concrete.

**7.5.1** Admixtures - type

**7.5.2** Aggregates - size

**7.5.3** Curing Materials

**7.5.4** Reinforcing Steel - size and type

**7.5.5** Evaporation Retardants

**7.5.6** Fly Ash - class

**7.5.7** Ground Granulated Blast Furnace Slag - grade

**7.5.8** Silica Fume

**7.5.9** Portland Cement - type

**7.5.10** Water - potable or non potable. If non-potable, the sampling and testing procedures shall be included.

**7.6 Process Control of Aggregates.** The procedure for monitoring aggregate gradation, water absorption, and Saturated Surface Dry (SSD) Bulk Specific Gravity to verify compliance with the properties of the aggregates used at the time of the trial batch demonstration.

**7.6.1** The gradation control band tolerances on each sieve for aggregates not in accordance with the gradations of 904.02 and 904.03 shall be included.

A statement that a copy of the control charts shall be obtained from the Certified Aggregate Producer (CAP) shall be included. The charts shall represent production and load-out test results for gradation since the CAP was certified, not to exceed the 30 most recent results, and shall be obtained within seven days of concrete placement operations. In lieu of obtaining control charts from the CAP, gradation tests of the aggregates stockpiled at the plant may be performed within seven days of concrete placement operations. If the gradation tests are conducted, the sampling and testing procedures shall be included.

The procedure for determination of the combined gradation shall be included. Gradation test results shall verify the maximum size of the aggregate and the mathematically combined amount passing the No. 200 (75  $\mu$ m) sieve of fine and coarse aggregates which have been proportioned in accordance with the concrete mix design.

**7.6.2** The procedures for determination of the water absorption and the SSD Bulk Specific Gravity shall be included. The minimum frequency of each test procedure shall be one test for each aggregate. The sampling and testing shall be conducted within 10 days prior to concrete placement operations. The 10 day period may be waived if the test results for the aggregate are from a captive stockpile.

**7.7 Trial Batch Demonstration.** The procedures, location, and type of equipment to be utilized during the trial batch demonstration(s)

**7.8 Concrete Batching.** The techniques and controls of the concrete batching operations. A description of the plant, including the capacity and intended batch size, and the methods and sequence by which the plant produces a batch shall be included.

The initial and routine equipment checks, including those performed on scales, water meters, admixture dispensers, mixing equipment, and agitators, if applicable, shall be included. All material checks, including frequencies of testing, shall be identified. The methods to monitor ingredients used, and the record of each batch shall be included.

- 7.9 Process Control or Concrete.** The location and procedures for sampling and testing the concrete mix for slump, air content and unit weight, water/cementitious ratio, and compressive strength. The process control samples shall be obtained from the site of work at the point of placement. The frequency of tests shall be included and as a minimum meet the following.
- 7.9.1 Slump.** The minimum frequency shall be one slump test for each subplot; however, the slump shall be determined on the concrete mix from the first concrete truck for each day of production.
- 7.9.2 Air Content and Unit Weight.** The minimum frequency of tests shall be one air content and one unit weight for each subplot; however, the air content and unit weight shall be determined on the concrete mix from the first concrete truck for each day of production. An additional air content and unit weight determination shall be made if there is a change in production, delivery, or placement.
- 7.9.3 Water/Cementitious Ratio.** The minimum frequency shall be one determination for each day of concrete placement operations.
- 7.9.4 Compressive Strength.** The minimum frequency of tests shall be one set of two cylinders tested at 28 days for each subplot.
- 7.10 Process Control of Reinforcing Steel.** The frequency and procedure for monitoring the depth of concrete over the uppermost bar of the top mat of reinforcing steel. A statement that measurements shall be obtained as soon as the concrete is placed and struck off, and while still plastic, shall be included.
- 7.11 Response to Test Results.** The response to process control tests shall include as a minimum the following:
- 7.11.1 Water Absorption.** The procedure for corrective action when the absorption test results for a particular size of aggregate differs from the mixture design value by more than 0.5 percent. A statement that the absorption value for the source shall be investigated and an absorption percent determined shall be included.
- 7.11.2 Bulk Specific Gravity (SSD).** The procedure of corrective action when the bulk specific gravity (SSD) of fine aggregate differs from the mixture design value by more than 0.056 or the bulk specific gravity (SSD) of coarse aggregate differs from the mixture design value by more than 0.032. A statement that the bulk specific gravity (SSD) value for the source shall be investigated and a bulk specific gravity (SSD) value determined shall be included.

- 7.11.3 Unit Weight.** The procedure for corrective action when the measured unit weight is not within process control limits from the value established by the measured air content and the linear equation representing the CMD. The process control limits shall not exceed  $\pm 1.0 \text{ lb/ft}^3$  ( $16 \text{ kg/m}^3$ ) from the predicted value based on the measured air content and shall ensure that the concrete has a unit weight above the threshold limit representing a water/cementitious ratio of 0.420 at the point of placement.
- 7.11.4 Slump.** The procedure for corrective action when the slump is not within process control limits. The process control limits shall be established from a target slump, the limits of which shall ensure that the concrete is within the concrete mix criteria at the point of placement.
- 7.11.5 Air Content.** The procedure for corrective action when the air content is not within process control limits. The process control limits shall be established from the 6.5 % target value, and shall ensure that the concrete produced is within the specification limits.
- 7.11.6 Other Quality Control Tests.** The procedure for corrective action for test results outside of satisfactory limits established for each type of test
- 7.12 Concrete Hauling.** The equipment and methods for delivery of the concrete. The description or plan drawing of the traffic patterns for delivery of the concrete mix to the site of work shall be included. The patterns may be adjusted for unanticipated conditions without an addendum to the QCP.
- 7.13 Concrete Placement.** The procedures for placement of the concrete to include as a minimum the placing sequence, identification of the placing equipment, and a description of the pumping procedures, if applicable.
- 7.14 Concrete Finishing, Texturing and Curing.** The methods for finishing, texturing, and curing concrete. The description and identification of equipment shall be included.
- 7.15 Forms, Falsework, and Centering.** The procedure for determining when the forms, falsework, and centering may be removed. The minimum sample size shall be two cylinders or one beam for each structural element and construction activity under evaluation. All samples shall be field cured.
- 7.16 Application of Loads.** The procedure for determining when loads may be applied to the concrete. The minimum sample size shall be two cylinders or one beam for each structural element and construction activity under evaluation. All samples shall be field cured.



- 7.17 Documentation.** The report format used to convey process control test results, and other pertinent information. Documentation of corrective actions shall be given to the Engineer within 24 h of such action. A statement that the test results for control shall be maintained for a period of three years upon completion of the contract shall be included. The records, either electronic and/or hard copies, shall be maintained at a readily accessible location for review by the Department at any time. Documentation shall include results for the aggregate tests, mixture tests, and depth of cover of concrete over reinforcing steel measurements.

## **8.0 FIELD PAINTING OF STEEL BRIDGE QCP.**

- 8.1 REFERENCES.** The Contractor's certification and quality control inspections for cleaning, coating applications and curing of coatings shall be in accordance with the current standards.

### **8.1.1 ASTM Standards.**

D 4285	Clean Compressed Air
D 4417	Field Measurement of Surface Profile of Blast Cleaned Steel
D 4752	Measuring MEK Resistance of Ethyl Silicate (Inorganic) Zinc-Rich Primers by Solvent Rub
E 337	Relative Humidity by Wet and Dry Bulb Psychrometer

### **8.1.2 SSPC Standards.**

AB 1	Mineral and Slag Abrasives
AB 2	Cleanliness of Recycled Ferrous Metallic Abrasives
AB 3	Ferrous Metallic Abrasive
Guide 6	Guide for Containing Debris Generated During Paint Operations
Guide 7	Disposal of Lead-Contaminated Surface Preparation Debris
Guide 15	Field Methods for Retrieval and Analysis of Soluble Salts on Steel and Other Nonporous Substrates
PA 2	Measurement of Dry Paint Thickness with Magnetic Gages
QP 1	Standard Procedures for Evaluating the Qualifications of Painting Contractors: Field Application to Complex Structures
QP 2	Standard Procedures for Evaluating the Qualifications of Painting Contractors to Remove Hazardous Paint
SP 1	Solvent Cleaning
SP 2	Hand Tool Cleaning
SP 3	Power Tool Cleaning
SP 6	Commercial Blast Cleaning
SP 7	Brush-Off Blast Cleaning
SP 10	Near-White Blast Cleaning

SP 11	Power Tool Cleaning to Bare Metal
Vis 1	Visual Standard for Abrasive Blast Cleaned Steel
Vis 3	Visual Standard for Power and Hand Tool Cleaned Steel

**8.1.3 Procedures to Provide Standards.** The proposed method to provide and maintain at the project site the current versions of all referenced standards.

**8.2 General.** The QCP shall contain information specific to each bridge in the contract and shall be well organized. The QCP shall be submitted for approval a minimum of 15 work days prior to commencing work.

**8.3 Quality Control Manager.** The Quality Control Manager shall be in accordance with 4.5 and shall be a NACE or SSPC certified coatings inspector. Documentation of the NACE or SSPC coating inspector certification shall be provided.

**8.4 Quality Control Technician.** The Quality Control Technician shall be in accordance with 4.5 and shall be a NACE or SSPC certified coatings inspector. Documentation of the NACE or SSPC coating inspector certification shall be provided.

**8.5 Quality Control Inspection.** The proposed methodology providing the specific inspections, equipment and documentation of inspections by the NACE or SSPC certified quality control technician shall be described in the following areas.

**8.5.1 Quality Control Inspection Instrumentation.** The methods, identification, and calibration of quality control instrumentation shall be provided.

**8.5.2 Quality Control Inspection Points.** The quality control inspection shall include the following inspection points for each lot of each structure, as applicable.

- a) Pressure washing
- b) Solvent cleaning
- c) Removal of soluble salts
- d) Near-white blast cleaning
- e) Commercial blast cleaning
- f) Hand tool cleaning
- g) Brush-off blast cleaning
- h) Power tool cleaning
- i) Power tool cleaning to bare metal
- j) Surface profile
- k) Primer coat application, cure and recoatability
- l) Intermediate coat application, cure and recoatability
- m) Finish coat application and cure

- n) Overspray removal
- o) Abrasive contamination
- p) Air compressor output contamination

**8.5.3 Quality Control Inspection Frequency.** As a minimum the quality control inspection frequency shall be in accordance with the specifications.

**8.6 SSPC Painting Contractor Certification Program.** The painting Contractor shall provide evidence of current certification to either SSPC-QP 1 or SSPC-QP 2.

**8.7 Traffic Maintenance Plan.** The traffic maintenance plan shall provide the proposed method and procedures to be used to protect against blasting or painting of vehicles or pedestrians, to eliminate abrasive materials and debris from falling onto the traveled portion of pavement, and the prevention of traffic hazards created by material being used by the Contractor, the Contractor's equipment, or other debris. The plan shall be in accordance with 801 and shall be structure specific for each affected lane of pavement, day and time of lane closure, and shall include the proposed protective devices to be used for the maintenance of traffic.

**8.8 Work Sequence Schedule.** When the contract contains more than one bridge, the scheduled sequence of work shall be provided.

**8.9 Pollution Control Plan.** The pollution control plan shall include the specific methods, procedures, equipment and training in the following areas.

**8.9.1 Containment Procedure.** The specific procedure which shall be used to prevent environmental pollution of the air, water, and soil and to contain all blasting materials, scrapings, wire brushings and paint particles. The containment procedure shall include the description of the equipment, including enclosures and ventilation systems such as dust collectors. Specific explanations about how each piece of equipment will be used to prevent the various forms of pollution and the daily schedule of inspection shall be provided. If the bridge is over water, a boom or flotation device shall be used as a backup containment device and shall be described. An alternate method of containment to the booms may be used provided it can be proven to be effective.

**8.9.2 Waste Contingency Plan.** The waste contingency plan shall address how a spill of waste shall be contained and cleaned. It shall contain the name of the emergency coordinator along with a telephone number at which the coordinator and the IDEM Emergency Response Branch can be reached 24 hours per day in case of a spill. When cleaning and painting over water, the contingency plan shall provide the telephone numbers for the local health department and all water intake users within 500 ft. (150 m).



- 8.9.3 Waste Training Program.** The written description of the type and amount of both introductory and continuing training given each employee handling waste as required by 40 CFR 265.16. Records, which document proof of employee training and job experience in handling waste, shall be included.
- 8.9.4 Waste Container, Storage, Labeling, Testing, and Disposal.** The procedure for storage, type of storage container, labeling, sampling, testing, and disposal of all hazardous and non-hazardous waste materials shall be provided. These shall comply with all applicable Federal, State, and local requirements. The disposal site shall be identified.
- 8.10 Health and Safety Plan.** The health and safety plan shall provide documentation of training for each employee, contain material safety data sheets for all materials, describe personnel protective equipment, explain monitoring of air during removal of hazardous-based paint, and contain all other health and safety requirements specified by State and Federal regulations.
- 8.11 Origin and Storage of Materials.** The documentation which furnishes the origin, procedures and methods of storage of all coatings, thinners, and abrasives shall be provided.
- 8.12 Surface Preparation of Structural Steel.** The techniques, methods, equipment, and controls of the surface preparation operations shall be described. The type of abrasive chosen shall be described.
- The waste residue samples are required to be tested for arsenic, barium, cadmium, chromium, lead, mercury, selenium, and silver by the TCLP in accordance with 40 CFR 261.24. If any of these contaminants are present in a concentration which exceeds the respective regulatory level indicated in Table 1 of 40 CFR 261.24, the waste residue shall be considered hazardous and is required to be handled accordingly.
- 8.13 Inspection Access Equipment.** All equipment used to provide access to the work area shall be maintained in safe working order. A list of the access equipment and the maintenance records of the equipment shall be provided.
- 8.14 Painting.** The techniques, equipment, and controls of the paint mixing, thinning and application of each coating shall be described. The Contractor shall contact IDEM and the local air pollution board for information concerning any volatile organic compound regulations or restrictions. Proof of contact to these agencies shall be provided. A description which contains the methods and sequence of all painting related activities and includes measurement of the surface temperature of the steel, dew point, temperature, humidity, curing of paints, removal of overspray, and manufacturer's application instructions and technical data sheets shall be provided.



If the Contractor uses coating materials that in accordance with the manufacturer's recommendations may be used outside the temperature or humidity limits stated in 619.10(a), the coating materials shall be listed. The manufacturer's application instructions and technical data sheets shall be provided.

The techniques and type of caulk used and documentation of the compatibility of the caulk with the coating material shall be provided.

## **8.15 Acceptance Testing**

### **8.15.1 Definitions**

- a) **Lot.** A lot will be a series of tests performed on each phase for each 100 sq ft (10 m<sup>2</sup>) of surface area, or portion thereof, to be measured.
- b) **Series.** A series will be 5 random spot measurements in a lot.
- c) **Spot Measurement.** A spot measurement will be the average of 3 gage readings obtained within a spot.
- d) **Spot.** A spot will be a 1-1/2 in. (38 mm) diameter circular area randomly selected within the lot.
- c) **Phase.** A phase shall be painting operations consisting of either the cleaning of steel or the application of each coat of paint.

**8.15.2 Procedure.** Surface profile and film thickness measurements will be based on the results of random testing within a lot. Random locations will include flanges, webs, cross frames, and diaphragms. The test results will be compared to the specified requirements for that phase. The series of spot measurements will meet the following requirements:

- a) If the average of the 5 spot measurements for each lot is less than the specified requirements, the lot will be considered as non-conforming.
- b) If a single spot measurement in a lot is less than 80% of the specified requirement, the lot will be considered as non-conforming; however, if there are no visual defects in the lot, the lot will be considered acceptable.
- c) If there are 2 spot measurements less than the specified requirement, a second series of tests will be obtained. If the first and second series of tests have a total of 4 or less spot measurements less than the specified requirement, the lot will be considered acceptable. If the first and second series of tests have a total of 5 or more spot measurements less





than the specified requirement, the lot will be considered as non-conforming.

- d) If there are 3 or more spot measurements less than the specified requirement in a lot, the lot will be considered as non-conforming.

**8.15.3 Frequency.** Spot measurements will be taken at the following frequency:

- a) For all shop painted steel, regardless of the size, one lot within each 300 ft<sup>2</sup> (30 m<sup>2</sup>) of surface area will be randomly selected and measured.
- b) For field painted steel structures with a surface area of less than 300 ft<sup>2</sup> (30 m<sup>2</sup>), each lot will be randomly selected and measured.
- c) For field painted steel structures with a surface area greater than 300 ft<sup>2</sup> (30 m<sup>2</sup>) and less than 1000 ft<sup>2</sup> (100 m<sup>2</sup>), 3 lots will be randomly selected and measured.
- d) For field painted steel structures with a surface area greater than 1000 ft<sup>2</sup> (100 m<sup>2</sup>), the first 1000 ft<sup>2</sup> (100 m<sup>2</sup>) area will be measured in accordance with 8.15.3c, and for each additional 1000 ft<sup>2</sup> (100 m<sup>2</sup>) surface area, or portion thereof, one lot will be randomly selected and measured.
- e) If the dry film thickness for any lot measured in 8.15.3c or 8.15.3d is not acceptable, then each 100 ft<sup>2</sup> (10 m<sup>2</sup>) surface area painted will be measured.

At the discretion of the Engineer, additional lots in excess of the requirements stated above may be measured for compliance.

- 8.16 Documentation.** The report format used to convey quality control instrument identification, calibrations, test results, visual inspections, temperature, humidity and dew point measurements and other pertinent information shall be described. Documentation of non-conforming lots and corrective actions shall be given to the Engineer before the next phase of work begins. A statement that the records for quality control shall be maintained for a period of three years upon completion of the contract shall be included. The records, either electronic and/or hard copies, shall be maintained at a readily accessible location for review by the Department at any time.



## **9.0 SHOP PAINTING OF STEEL FOR BRIDGES QCP.**

### **9.1 REFERENCES.**

#### **9.1.1 ASTM Standards.**

D 4285 Clean Compressed Air  
D 4417 Field Measurement of Surface Profile of Blast Cleaned Steel  
D 4752 Measuring MEK Resistance of Ethyl Silicate (Inorganic) Zinc-Rich  
Primers by Solvent Rub  
E 337 Relative Humidity by Wet and Dry Bulb Psychrometer

#### **9.1.2 SSPC Standards.**

PA 2 Measurement of Dry Paint Thickness with Magnetic Gages  
SP 10 Near-White Blast Cleaning  
Vis 1 Visual Standard for Abrasive Blast Cleaned Steel

**9.1.3 Procedure to Provide Standards.** The method to provide and maintain current versions of all referenced standards

**9.2 General.** The QCP shall contain information specific to each bridge in the contract and shall be well organized. The QCP shall be submitted for approval a minimum of 15 work days prior to commencing work.

**9.3 Quality Control Manager.** The Quality Control Manager shall be in accordance with 4.5 and shall be a NACE or SSPC certified coatings inspector. Documentation of the NACE or SSPC coating inspector certification shall be provided.

**9.4 Quality Control Technician.** The Quality Control Technician shall be in accordance with 4.5 and shall be a NACE or SSPC certified coatings inspector. Documentation of the NACE or SSPC coating inspector certification shall be provided.

**9.5 Surface Preparation of Structural Steel.** The techniques, equipment, materials, and controls of the surface preparations shall be described.

**9.6 Painting.** The techniques, equipment, and controls of the paint mixing, thinning, application and curing of each coating shall be described. A description of the methods and sequence of all painting related activities shall be provided and shall include the measurement of the surface temperature of the steel, dew point, temperature, humidity, curing of paints, and manufacturer's application instructions and technical data sheets.



**9.7 Quality Control Inspection.** The proposed methodology providing the specific inspections, equipment and documentation of inspections by the NACE or SSPC certified quality control technician shall be described in the following areas.

**9.7.1 Quality Control Instrumentation.** The methods, identification, and calibration of quality control instrumentation shall be provided.

**9.7.2 Quality Control Inspection Frequency.** The QCP shall contain the quality control inspection frequency. As a minimum the frequency of quality control inspections for cleaning of the steel, surface profile, dry film thickness and solvent resistance of the inorganic zinc primers shall be equal to or more frequent than the measurement frequency contained in 8.15.3.

**9.7.3 Quality Control Documentation.** The report format used to convey quality control test results, visual inspections, and other pertinent information shall be described. Documentation of non-conforming work and corrective actions shall be given to the Engineer before the next phase begins. A statement that the test results for control shall be maintained for a period of three years upon completion of the contract shall be included. The records, either electronic and/or hard copies, shall be maintained at a readily accessible location for review by the Department at any time.

## **10.0 Seal Coat**

### **10.1 References.**

#### **10.1.1 INDOT Specification Section 404**

#### **10.1.2 AASHTO Standards.**

T 19 Bulk Density ("Unit Weight") and Voids in Coarse Aggregate

T 27 Sieve Analysis of Fine and Coarse Aggregate

T 85 Specific Gravity and Absorption of Coarse Aggregate

#### **10.1.3 ASTM Standards.**

D 5624 Determining the Transverse-Aggregate Spread Rate for Surface Treatment Applications

#### **10.1.4 ITM Standards.**

579 Quantity Determination of Bituminous Materials and Aggregates for Seal Coats



**10.2 Quality Control Technician.** The quality control technician shall be responsible for the following minimum functions:

**10.2.1** Seal Coat operations and joint construction

**10.2.2** Quality control tests for temperature and coarse aggregate, and determination of the application rate

**10.3 Process Balance.** The methodology for balancing the operation, to include transportation, placement, and rolling. The corrective action procedure for keeping the total operation in balance shall be provided.

**10.4 Sealing.** The procedures for placement of the seal coat shall include as a minimum the following:

**10.4.1** Equipment. The manufacturer's make, model and type of aggregate spreaders, distributors, brooms and rollers that shall be used

**10.4.2** Seal Coat Plan. The general sequence, widths of seal coat for each pass, and the planned date for sealing to begin and to be completed on the contract. Also, the method of placing multiple course seal coats (types 5, 6, 7) shall be included.

**10.4.3** Joints. The procedure for the construction of the longitudinal and transverse joints. The starting and stopping procedures of the distributor and aggregate spreader for transverse joints shall be included.

**10.4.4** Application Rate. The target application rates for aggregate and asphalt material, actual application rate, and method for making adjustments

**10.4.5** Rolling. The method and number of rollers to be used to ensure proper application, and the procedure to assure rolling without dislodging the aggregates

**10.4.6** Brooming. The procedure and schedule for sweeping loose aggregate, including initial and final brooming

**10.4.7** Stop Controlled Intersections. The method of construction up to or through stop controlled intersections to minimize damage to the newly applied seal coat

**10.4.8** Traffic Control. The method of controlling traffic on newly applied sealed surface, and the plan for opening to traffic without damage to seal coat





**10.5 Materials Sampling and Testing.** The procedures for sampling and testing of the aggregate and asphalt material and the frequency of tests shall be identified and include as a minimum the following:

**10.5.1 Aggregates.** The source, source number, source location, approval number, and the type of coarse aggregate used for the seal coat. The following information shall also be supplied:

1. Gradation
2. Bulk Specific Gravity
3. Absorption
4. Loose Unit Weight

**10.5.2 Asphalt Material.** The source, source number, type, and grade of material that shall be used for the seal coat

**10.5.3 Temperature.** The method of measuring the temperature of the asphalt material, and the appropriate temperature range as specified by the manufacturer

**10.6 Response to Test Results.** The response to quality control tests shall include as a minimum the following:

**10.6.1 Coarse Aggregate.** The procedure for corrective action in response to tests on the coarse aggregate

**10.6.2 Application Rate.** The procedure for corrective action in response to applied application rates differing from the target rates

**10.6.3 Temperature.** The procedure for corrective action in response to temperature measurements

**10.7 Documentation.** A statement that the test results for control and documentation of equipment shall be maintained for a period of three years upon completion of the contract shall be included. The records, either electronic and/or hard copies, shall be maintained at a readily accessible location for review by the Department at any time. The documentation shall include the following:

**10.7.1 Quality Control Tests.** The test results for the coarse aggregate and temperature tests, and application rates

**10.7.2 Equipment.** Documentation of the manufacture, model, and type of aggregate spreader, distributor, rollers, and brooms used each day of sealing. Modifications to this equipment shall be noted.



**10.7.3** Daily report. The following shall be recorded for each day of constructing seal coat application:

1. Route
2. Date
3. Air temperature at beginning of work, midday, and end of work
4. Beginning and ending references
5. Counter readings (beginning, ending, and total)
6. Length, width, total area, aggregate quantity, emulsion quantity
7. Contractor's authorized signature
8. Aggregate gradations
9. Aggregate delivery tickets
10. Asphalt bill of lading
11. Target application rate
12. Applied application rate

## **11.0 MICRO-SURFACING QCP.**

### **11.1 References.**

#### **11.1.1 AASHTO Standards.**

M 208	Polymer Modified Asphalt Emulsion
T 53	Softening Point of Bitumen (Ring and Ball Apparatus)
T 59	Testing Emulsified Asphalts
T 176	Plastic Fines in Graded Aggregates and Soils by Use of the sand Equivalent Test
T 202	Viscosity of Asphalts by Vacuum Capillary Viscometer
T 301	Elastic Recovery Test of Bituminous Materials by Means of a Ductilometer
T 304	Uncompacted Void Content of Fine Aggregate

#### **11.1.2 ASTM Standards.**

D 5821	Course Aggregate Angularity
E 274	Skid Resistance/Friction Number Measurement
E 524	Skid Resistance/Friction Number Measurement

**11.2 Quality Control Technician.** The quality control technician shall be responsible for the following minimum functions:

**11.2.1** Micro-surfacing operations and joint construction

**11.2.2** Quality control tests for temperature, aggregates, and application rate



**11.3 Design Mix Formula (DMF).** A mixture shall be produced that is in compliance with the DMF and the quality control tolerances. The methods described in this section shall be used to measure compliance. Quality control documentation shall be maintained and made available to the Engineer upon request or at the completion of the contract.

**11.3.1 Fine Aggregate.** The fine aggregate shall be sampled from the project stockpile and test the aggregate for gradation at a rate of one test for each 500 t (500 Mg) of aggregate used, or a minimum of one test for each day of mixture production. The quality control tolerances from the DMF shall be as follows:

Sieve Size	Tolerance
No. 4 (4.75 mm)	$\pm 5.0\%$
No. 8 (2.36 mm)	$\pm 5.0\%$
No. 16 (1.18 mm)	$\pm 5.0\%$
No. 30 (600 $\mu\text{m}$ )	$\pm 5.0\%$
No. 50 (300 $\mu\text{m}$ )	$\pm 4.0\%$
No. 100 (150 $\mu\text{m}$ )	$\pm 3.0\%$
No. 200 (75 $\mu\text{m}$ )	$\pm 3.0\%$

**11.3.2 Sand Equivalent Test.** The sand equivalent test in accordance with AASHTO T 176 shall be conducted for each applied aggregate gradation. The quality control tolerance shall be  $\pm 7\%$  from the DMF.

**11.3.3 Asphalt Content.** The percent asphalt content of the mixture shall be calculated from the equipment counter readings obtained randomly a minimum of three times a day. The single test asphalt content tolerance shall be  $\pm 0.5\%$  from the DMF and the average daily asphalt content shall be  $\pm 0.2\%$  from the DMF.

**11.4 Process Balance.** The methodology for balancing the operation, to include transportation and placement. The corrective action procedure for keeping the total operation in balance shall be provided.

**11.5 Placement.** The procedures for placement of the micro-surfacing shall include as a minimum the following:

**11.5.1 Equipment.** The manufacturer's make and model of the equipment that shall be used (Micro-Surfacing Placement Machine, Material Transfer Equipment, Drag Box, Sweepers, etc.)

**11.5.2 Surface Preparation.** The procedure to provide a clean and sound surface on which the micro-surfacing is to be applied



- 11.5.3 Placement Plan.** The general sequence, the widths and depths of placement for each course, and the planned date for placement to begin and to be completed on the contract
- 11.5.4 Application Rate.** The application rate of the micro-surfacing. The yield of the course being placed shall be calculated from the equipment counter readings obtained randomly a minimum of three times a day.
- 11.5.5 Material Feed System.** The procedure for processing the mixture through the Micro-Surfacing Placement Machine
- 11.5.6 Grade and Slope.** The procedure for controlling the grade and slope, including a description of placing rut fill and level courses, if applicable
- 11.5.7 Joints.** The procedure for the construction of the longitudinal and transverse joints. The starting and stopping procedures of the Placement Machine for transverse joints shall be included.
- 11.5.8 Asphalt Materials.** The source, source numbers, type, and grade of materials that shall be used
- 11.5.9 Traffic Control.** The method of controlling the traffic on the newly applied micro-surfacing, and the plan for opening to traffic without damage to the micro-surfacing
- 11.6 Materials Sampling and Testing.** The procedures for sampling and testing of the aggregate and micro-surfacing materials and the frequency of tests shall be identified and include as a minimum the following:
  - 11.6.1 Aggregates.** The source, source number, source location, approval number, and type of aggregates used for the micro-surfacing
  - 11.6.2 Asphalt Material.** The source, source number, type, and grade of material that shall be used for the micro-surfacing
  - 11.6.3 Temperature.** The method of measuring the temperature of the asphalt material, and the appropriate temperature range as specified by the manufacturer
  - 11.6.4 Surface Quality.** The procedure for measuring the smoothness and ride quality of the finished micro-surfacing





**11.7 Response to Test Results.** The response to quality control tests shall include as a minimum the following:

**11.7.1 Mixture.** The procedure for corrective action in response to mixture tests from the pavement

**11.7.2 Aggregates.** The procedure for corrective action in response to tests on the aggregates

**11.7.3 Application Rate.** The procedure for corrective action in response to applied application rates differing from the target rates

**11.7.4 Temperature.** The procedure for corrective action in response to temperature measurements

**11.8 Pavement Smoothness.** The procedure for correcting the profile of non-complying pavement. Areas outside of the allowable Standard Specification tolerance shall be corrected.

**11.9 Documentation.** A statement that the test results for control and documentation of equipment shall be maintained for a period of three years upon completion of the contract shall be included. The records, either electronic and/or hard copies, shall be maintained at a readily accessible location for review by the Department at any time. The documentation shall include the following:

**11.9.1 Quality Control Tests.** The results for the mixture, temperature, and smoothness tests of the pavement

**11.9.2 Equipment.** Documentation of the manufacture, model, and type of equipment used each day of placement. Modifications to this equipment shall be noted.

**11.9.3 Daily Report.** The following shall be recorded for each day of micro-surfacing application:

1. Control section
2. Job number
3. Route
4. Date
5. Air temperature
6. Control settings (calibration values, unit weight of emulsion, percent residue of emulsion)
7. Beginning and ending intervals
8. Counter readings (beginning, ending, and total)
9. Length, width, total area, aggregate quantity, emulsion quantity



10. Percent of each material, percent of asphalt cement, application rate, combined application rate
11. Contractor's authorized signature
12. Aggregate gradations
13. Aggregate delivery tickets
14. Asphalt emulsion bill of lading
15. Sand equivalent value
16. Theoretical application rate (not applicable to rut fill course)
17. Yield

A statement that all material certifications, production test reports, quality control charts, test equipment certifications and calibrations, and all other material and/or design or production related records shall be maintained for a period to include the terms of the warranty. Upon completion of the placement, and the opening of the warranted micro-surfacing to traffic, a copy of all records shall be provided to the District Construction Engineer and the Office of Pavement Engineering

## **12.0 TRENCHLESS PIPE INSTALLATION QCP.**

### **12.1 References.**

#### **12.1.1 INDOT Specification Section 716**

**12.2 General.** The QCP shall contain information specific to the pipe structures to be placed by means of trenchless installation. The QCP shall be submitted a minimum of 15 days prior to commencing work.

**12.3 Managers.** The name, position and trenchless pipe installation work experience for each superintendent, foreman or other manager that will be on-site and directly in charge of the daily operations.

**12.4 Calculations.** Design calculations and detail drawings of the pipe to be installed by jacking. The calculations shall demonstrate that the pipe is of sufficient strength to resist the maximum jacking forces without damage to the pipe.

**12.5 Installation Plans.** Plan sheets on 11in. x 17in. or larger paper showing the location, dimensions and elevations of jacking or boring pits and pertinent site features, including right-of-way lines, edge of pavement, existing pipe structures, existing utilities and any known potential obstructions.

**12.6 Methods.** A detailed description of the trenchless pipe installation method to be used for each pipe structure, including:

1. A description of the methods for controlling the line and grade



2. A description of the method to be used for grouting the annular space between the bored hole and the carrier pipe or the casing pipe and the carrier pipe, as applicable
3. The plan for penetrating, removing or otherwise managing obstructions, if encountered
4. The plan for dewatering, if required, including the method of controlling erosion and sediment from dewatering operations
5. The plan for ensuring that all voids created by trenchless pipe installation operations are filled in a timely manner
6. The plan for monitoring surface settlement or heave, including the response plan for unacceptable settlement or heave

**12.7 Materials.** A list of all materials and their sources to be used for each pipe structure including, but not limited to, the following:

1. Casing pipe (if separate from the carrier pipe)
2. Carrier pipe
3. Grout
4. Bentonite or other lubricants
5. Slurry mixes

**12.8 Equipment.** A list of each piece of equipment to be used for each pipe structure. The equipment manufacturer's operation manuals shall be provided upon request.



**HOT MIX ASPHALT  
QUALITY CONTROL PLAN CHECKLIST**

**CONTRACT NO.** \_\_\_\_\_ **DATE** \_\_\_\_\_

**CONTRACTOR** \_\_\_\_\_

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**SIGNATURE PAGE**

- ☐ Submitted 15 days prior to paving
- ☐ QCP signed and dated by QCP Manager

**QUALITY CONTROL PERSONNEL**

**QCP Manager**

- ☐ Name
- ☐ Qualifications
- ☐ Telephone number
- ☐ Duties
- ☐ Employer

**QCP Site Manager**

- ☐ Name
- ☐ Qualifications
- ☐ Telephone number
- ☐ Duties
- ☐ Employer
- ☐ \* Same person as QCP Manager

**Quality Control Technicians**

- ☐ Name
- ☐ Qualifications (INDOT Qualified Technician)
- ☐ Telephone number
- ☐ Duties
- ☐ Employer
- ☐ \* Same person as QCP Manager
- ☐ \* Same person as QCP Site Manager

\* Only if applicable

**MILLING**

**General Procedure**

- ☐ Asphalt milling
- ☐ Asphalt removal
- ☐ PCCP milling

- ☐ Scarification and profile milling
- ☐ Transition milling

**Equipment**

- ☐ Milling machine
- ☐ Power saw
- ☐ Rotary power broom

**Macrotexture**

- ☐ Procedure for measuring macrotexture
- ☐ Test method
- ☐ Frequency

**Smoothness**

- ☐ Procedure for measuring cross-slope and longitudinal surface finish
- ☐ Frequency

**PROCESS BALANCE**

- ☐ Plant production established
- ☐ Approximate number of trucks procedure
- ☐ Paver speed procedure
- ☐ Compaction production rate procedure
- ☐ Corrective action procedure

**TRANSPORTATION OF MIXTURE**

- ☐ Criteria for truck bed covers and person directing use
- ☐ Truck unloading procedure
- ☐ Procedure for removal of mixture remaining in truck bed and on bed apron
- ☐\* Transfer vehicles
  - ☐ Type
  - ☐ Size
  - ☐ Plan for bridge crossings

**PAVING****Paver(s)**

- ☐ Manufacturer
- ☐ Make
- ☐ Model
- ☐ Serial number
- ☐ Manufactured year
- ☐ Literature with pictures

\* Only if applicable



**Paving Plan**

- ☐ General sequence of paving
- ☐ Widths and depths of paving for each of major courses
- ☐ Planned date for paving to begin on contract
- ☐ Planned date for paving to be completed on contract

**Material Feed System**

- ☐ Procedure for processing mixture through paver

**Grade and Slope**

- ☐ Procedure for controlling grade and slope
- ☐\* Procedure for placing wedge and level

**Joints**

- ☐ Procedure for construction of longitudinal joints
- ☐ Procedure for construction of transverse joints
- ☐ Procedure for starting and stopping the paver for transverse joints

**Asphalt Materials**

- ☐ Tack coat
  - ☐ Source
  - ☐ Source number
  - ☐ Type
  - ☐ Grade
- ☐\* Prime coat
  - ☐ Source
  - ☐ Source number
  - ☐ Type
  - ☐ Grade
- ☐\* Seal coat
  - ☐ Source
  - ☐ Source number
  - ☐ Type
  - ☐ Grade

**JOINT COMPACTION**

- ☐ Procedure for compaction of longitudinal joints
- ☐ Procedure for compaction of transverse joints

**MATERIALS SAMPLING AND TESTING****Certified HMA Plant**

- ☐ Producer name
- ☐ Plant location
- ☐ Plant number
- ☐ Certified Producer

\* Only if applicable



**Mix Temperature at Paver**

- ☐ Procedure
- ☐ Location (behind paver prior to compaction)
- ☐ Testing frequency (min. 1/h of paving)

**Density**

- ☐ Procedure for measuring density
- ☐ Test method
- ☐ Location
- ☐ Testing frequency for mainline mixture (min. 1/1000 yd<sup>2</sup> (800 m<sup>2</sup>))

**Density**

- ☐ Testing frequency for shoulder mixture (min. 1/1000 yd<sup>2</sup> (800m<sup>2</sup>))
- ☐ Calibration documentation for non-destructive density device (min. 1/12 mo.)
- ☐ Procedure for monitoring temperature of mix during compaction to optimize rolling pattern

**Coring**

- ☐ Plan for when cores are taken
- ☐ Procedure for refilling core holes

**Smoothness**

- ☐ Procedure for measuring smoothness
- ☐\* Profilograph
  - ☐ Manufacturer
  - ☐ Serial Number
  - ☐ Certification included

**RESPONSE TO TEST RESULTS****Mixture**

- ☐ Procedure for corrective action temperature
- ☐ Procedure for correction action

**Density**

- ☐ Procedure for corrective action

**Smoothness**

- ☐ Procedure for correcting profile on non-complying pavement

\* Only if applicable

**DOCUMENTATION**

- ☐ Statement that Quality Control tests and documentation of equipment used on contract shall be maintained for a period of three years after completion of contract and that the location shall be readily accessible for review by the Department.

**Quality Control Tests**

- ☐ Mixture
- ☐ Temperature
- ☐ Density
- ☐ Smoothness

**Equipment**

- ☐ Paver(s) used each day
  - ☐ Manufacturer
  - ☐ Model
  - ☐ Type
  - ☐ Modification
- ☐ Roller(s) used each day
  - ☐ Manufacturer
  - ☐ Model
  - ☐ Type
  - ☐ Modification

\* Only if applicable

**PORTLAND CEMENT CONCRETE PAVEMENT  
QUALITY CONTROL PLAN CHECKLIST**

**CONTRACT NO.** \_\_\_\_\_ **DATE** \_\_\_\_\_

**CONTRACTOR** \_\_\_\_\_

---

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**SIGNATURE PAGE**

- ☐ Submitted 15 days prior to paving
- ☐ QCP signed and dated by QCP Manager

**QUALITY CONTROL PERSONNEL**

**QCP Manager**

- ☐ Name
- ☐ Qualifications
- ☐ Telephone number
- ☐ Duties
- ☐ Employer

**QCP Site Manager**

- ☐ Name
- ☐ Qualifications
- ☐ Telephone number
- ☐ Duties
- ☐ Employer
- ☐\* Same person as QCP Manager

**Quality Control Technicians**

- ☐ Name
- ☐ Qualifications (ACI Cert Concrete Field Testing Tech, Grade 1)
- ☐ Telephone number
- ☐ Duties
- ☐ Employer
- ☐\* Same person as QCP Manager
- ☐\* Same person as QCP Site Manager

**TESTING FACILITY**

- ☐ Location
- ☐ List of test equipment
- ☐ Access statement
- ☐ Test methods and frequency of calibration/verification

\* Only if applicable



**MATERIALS -- Source, Transportation, Handling, and Storage Procedures**

- ☐\* Admixtures - type
- ☐ Aggregates - size
- ☐ Curing materials
- ☐ Dowel bars - size
- ☐ Dowel bar assemblies, size
- ☐\* Fly ash - class
- ☐\* Ground granulated blast furnace slag - grade
- ☐ Joint fillers - type
- ☐ Joint materials - type
- ☐ Portland cement - type
- ☐ Reinforcing steel, size and type
- ☐ Water - if non-potable, the sampling and testing procedures

**PROCESS CONTROL OF AGGREGATES****Gradation**

- ☐\* Control band tolerances on each sieve for aggregates not in accordance with 904.02(g) and 904.03(e)
- ☐ Sampling procedure
- ☐ Sample reduction procedure
- ☐ Test method
- ☐ Procedure for determination of combined aggregate gradation
- ☐ Testing frequency for each aggregate size (minimum - one test for each day of concrete paving operations)

**Water Absorption**

- ☐ Test methods
- ☐ Testing frequency (minimum two tests for each aggregate used during concrete paving operations)

**Aggregate Stockpiles**

- ☐ Stockpiling procedure
- ☐ Procedure for identification of stockpiles
- ☐ Loading procedures

**TRIAL BATCH DEMONSTRATION**

- ☐ Location
- ☐ Type of equipment
- ☐ Procedures
- ☐ Identification and intended use of each mixture

\* Only if applicable

**CONCRETE BATCHING**

- ☐ Description of plant, including capacity and intended batch size
- ☐ Method and sequence of batching
- ☐ Minimum mixing time
- ☐ Initial and routine equipment checks (e.g., mixers, scales, water meters, and admixture dispensers) ☐ Material checks and frequency of testing
- ☐ Methods of monitoring ingredients
- ☐ Method of recording each batch

**PROCESS CONTROL OF CONCRETE****Flexural Strength**

- ☐ Sampling procedure
- ☐ Test method
- ☐ Testing frequency (minimum one set of two beams/sublot)

**Air Content**

- ☐ Sampling procedure
- ☐ Test method
- ☐ Testing frequency (minimum one test/sublot)

**Unit Weight**

- ☐ Sampling procedure
- ☐ Test method
- ☐ Testing frequency (minimum one test/sublot)

**Water/Cementitious Ratio**

- ☐ Frequency of determination (minimum of one/week or one/5 lots whichever is more restrictive)

**Temperature at Paver**

- ☐ Test method
- ☐ Testing frequency (minimum 2/h of paving)

**PROCESS CONTROL OF PAVEMENT**

- ☐ Procedure for monitoring depth
- ☐ Procedure for measuring surface profile
- ☐ Procedure for correcting profile non-compliance
- ☐ Procedure for measuring smoothness
- ☐ Procedure for correcting smoothness non-compliance
- ☐ Profilograph certification included

**CONTROL CHARTS**

- ☐ Procedure for charting quality control test results for flexural strength, unit weight, and air content
- ☐ \* Deviations from standard control chart legend

\* Only if applicable





**RESPONSE TO TEST RESULTS****Water Absorption**

- ☐ Procedure for corrective action when test results differs from design mix value by more than 0.5 percent
- ☐ Statement that production shall be discontinued when tolerance is exceeded

**Other Quality Control Tests**

- ☐ Procedure for corrective action
  - ☐ Flexural Strength
  - ☐ Unit Weight
  - ☐ Air Content

**CONCRETE HAULING**

- ☐ Equipment and methods for delivery to paver
- ☐ Traffic pattern at plant vicinity and to the site of work
- ☐\* Temporary adjustments to traffic flow
- ☐\* Procedure for adding water to PCC and required mixing time when using transit mixers

**CONCRETE PAVING****Paving Plan**

- ☐ General sequence of construction
- ☐ Widths and methods of placement for all areas
- ☐ Planned date for paving to begin and to be completed on each phase of the contract

**Cold Weather Paving (Below 35°F (2°C))**

- ☐ Protection of subgrade
- ☐ Treatment of concrete components
- ☐ Protection of PCCP

**Night Paving**

- ☐\* Procedure for utilizing artificial lighting when natural light is insufficient
- ☐\* Number and type of units

**Paving**

- ☐ Technique of concrete placement throughout project (includes joining existing pavement, caps, headers, crossovers, approaches, or tapers)

**Equipment**

- ☐ List of paving equipment on each phase of project

**Alignment and Profile**

- ☐ Methods of controlling alignment and profile

**Placement and Consolidation**

- ☐ Methods of depositing plastic concrete from hauling equipment to grade
- ☐ Methods of spreading and consolidating

\* Only if applicable



**JOINTS**

- ☐ Type of sealant and manufacturers recommendation of installation for each type of joint construction
- ☐ Preventive measures for flow of cementious material into previously placed and sawn joints

**D-1 Contraction**

- ☐ Procedure for identifying project conditions so that joints are continuous from edge of pavement to edge of pavement
- ☐ Method of installation
- ☐ Method of alignment
- ☐ Timing of sawing
- ☐ Method of protection

**Longitudinal**

- ☐ Method of construction to include reinforcing steel placement and timing of saw cuts

**Transverse**

- ☐ Method of construction to include details of type of header and reinforcing steel when paving operations are suspended

**Longitudinal Construction**

- ☐ Method of construction and proposed spacing if other than shown on plans

**FINISHING, TEXTURING, AND CURING**

- ☐ Methods for finishing, texturing, and curing PCCP
- ☐ List of equipment

**DOCUMENTATION**

- ☐ Statement that aggregate and mixture tests, and profile, smoothness, and depth of pavement measurements shall be maintained for a period of three years after completion of contract and that the location shall be readily accessible for review by the Department.

\* Only if applicable



**SUPERSTRUCTURE CONCRETE  
QUALITY CONTROL PLAN CHECKLIST**

**CONTRACT NO.** \_\_\_\_\_ **DATE** \_\_\_\_\_

**CONTRACTOR** \_\_\_\_\_

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**SIGNATURE PAGE**

- ☐ Submitted 15 days prior to paving
- ☐ QCP signed and dated by QCP Manager

**QUALITY CONTROL PERSONNEL**

**QCP Manager**

- ☐ Name
- ☐ Qualifications
- ☐ Telephone number
- ☐ Duties
- ☐ Employer

**QCP Site Manager**

- ☐ Name
- ☐ Qualifications
- ☐ Telephone number
- ☐ Duties
- ☐ Employer
- ☐ \* Same person as QCP Manager

**Quality Control Technicians**

- ☐ Name
- ☐ Qualifications (Cert Concrete Tech)
- ☐ Telephone number
- ☐ Duties
- ☐ Employer
- ☐ \* Same person as QCP Manager
- ☐ \* Same person as QCP Site Manager

**TESTING FACILITY**

- ☐ Location
- ☐ List of test equipment
- ☐ Test methods and frequency of calibration/verification

\* Only if applicable

**MATERIALS -- Source, Transportation, Handling, and Storage Procedures**

- ☐\* Admixtures - type
- ☐ Aggregates - size
- ☐ Curing materials
- ☐\* Evaporation retardants
- ☐\* Fly ash - class
- ☐\* Ground granulated blast furnace slag - grade
- ☐ Portland cement - type
- ☐ Reinforcing steel, - size and type
- ☐ Water - if non-potable, the sampling and testing procedures

**PROCESS CONTROL OF AGGREGATES****Gradation**

- ☐\* Control band tolerances on each sieve for aggregates not in accordance with 904.02(g) and 904.03(e)
- ☐ Statement that control charts shall be obtained from Certified Aggregate Producer for production and load-Out tests of each aggregate, within 7 days of concrete placement operations
- ☐ Gradation Tests
  - ☐ Sample procedures
  - ☐ Sample reduction procedure
  - ☐ Test method
  - ☐ Testing frequency (within 7 days of concrete placement operations)
- ☐ Procedure for determination of combined aggregate gradation

**Water Absorption**

- ☐ Test Methods
- ☐ Testing frequency (minimum of one test for each aggregate used during concrete paving operations)

**SSD Bulk Specific Gravity**

- ☐ Test methods
- ☐ Testing Frequency (minimum of one test for each aggregate used during concrete paving operations)

**TRIAL BATCH DEMONSTRATION**

- ☐ Location
- ☐ Type of equipment
- ☐ Procedures

**CONCRETE BATCHING**

- ☐ Description of plant, including capacity and intended batch size
- ☐ Initial and routine equipment checks (e.g., mixers, scales, water meters, admixture dispensers, mixing equipment, and agitators, if applicable)
- ☐ Material checks and frequency of testing
- ☐ Methods of monitoring ingredients
- ☐ Method of recording each batch

\* Only if applicable





**PROCESS CONTROL OF CONCRETE****Slump**

- ☐ Sampling procedure
- ☐ Test method
- ☐ Testing frequency (minimum of one test/sublot, and first truck for each day of production)

**Air Content and Unit Weight**

- ☐ Sampling procedure
- ☐ Test method
- ☐ Testing frequency (minimum of one test/sublot, first truck for each day of production, and when there is a change in production, delivery, or placement)

**Water/Cementitious Ratio**

- ☐ Frequency of determination (minimum of one for each day of concrete operations)

**Compressive Strength**

- ☐ Sampling procedure
- ☐ Test method
- ☐ Testing frequency (minimum of one set of two cylinders at 28 days for each sublot)

**PROCESS CONTROL OF REINFORCING STEEL**

- ☐ Procedure for monitoring depth of concrete over uppermost bar of top mat
- ☐ Frequency of depth measurements
- ☐ Statement that measurements shall be taken as soon as concrete is placed and struck off and while still plastic

**RESPONSE TO TEST RESULTS****Water Absorption**

- ☐ Procedure for corrective action when test results differ from design mix value by more than 0.5 percent
- ☐ Statement that source shall be investigated and an absorption percent determined

**Bulk Specific Gravity (SSD)**

- ☐ Procedure for corrective action when test results differ by more than 0.056 for fine aggregate or 0.32 for coarse aggregates from the design mix value
- ☐ Statement that source shall be investigated and Bulk Specific Gravity (SSD) determined

**Unit Weight**

- ☐ Procedure for corrective action when test results differ by more than  $\pm 1.0 \text{ lb/ft}^3$  ( $16 \text{ kg/m}^3$ ) from predicted value for air content measurements (not to exceed unit weight representing w/c of 0.420)

\* Only if applicable



**Slump**

- ☐ Procedure for corrective action when test results exceed process control limits from the target slump

**Air Content**

- ☐ Procedure for corrective action when test results exceed process control limits from the 6.5% target value

**Other Quality Control Tests**

- ☐ Procedure for corrective action
  - ☐ Compressive strength
  - ☐\* Other tests

**CONCRETE HAULING**

- ☐ Equipment and methods for delivery
- ☐ Traffic pattern to the site of work

**CONCRETE PLACEMENT**

- ☐ Placing sequence
- ☐ Identification of placing equipment
- ☐ Description of pumping procedures

**FINISHING, TEXTURING, AND CURING**

- ☐ Method for finishing, texturing, and curing concrete
- ☐ Description and identification of equipment

**FORMS, FALSEWORK, AND ENTERING**

- ☐ Procedure for determining when forms, falsework, and centering may be removed
- ☐ Frequency of samples for determination of removal (minimum of two cylinders or one beam that are field cured)

**APPLICATION OF LOADS**

- ☐ Procedure for determining when loads may be applied to concrete
- ☐ Frequency of samples for determination of application of loads (minimum of two cylinders or one beam that are field cured)

**DOCUMENTATION**

- ☐ Statement that aggregate and mixture tests, and depth of cover of concrete over reinforcing steel measurements shall be maintained for a period of three years after completion of contract and that the location shall be readily accessible for review by the Department.

\* Only if applicable



**SEAL COAT  
QUALITY CONTROL PLAN CHECKLIST**

**CONTRACT NO.** \_\_\_\_\_ **DATE** \_\_\_\_\_

**CONTRACTOR** \_\_\_\_\_

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**SIGNATURE PAGE**

- ☐ Submitted 15 days prior to paving
- ☐ QCP signed and dated by QCP Manager

**QUALITY CONTROL PERSONNEL**

**QCP Manager**

- ☐ Name
- ☐ Qualifications
- ☐ Telephone number
- ☐ Duties
- ☐ Employer

**QCP Site Manager**

- ☐ Name
- ☐ Qualifications
- ☐ Telephone number
- ☐ Duties
- ☐ Employer
- ☐\* Same person as QCP Manager

**Quality Control Technicians**

- ☐ Name
- ☐ Qualifications (INDOT Qualified Technician)
- ☐ Telephone number
- ☐ Duties
- ☐ Employer
- ☐\* Same person as QCP Manager
- ☐\* Same person as QCP Site Manager

\* Only if applicable



**PROCESS BALANCE**

- ☐ Aggregate production established
- ☐ Approximate number of trucks procedure
- ☐ Distributor and Aggregate Spreader speed procedure
- ☐ Roller production rate procedure
- ☐ Corrective action procedure

**SEALING****Aggregate Spreader(s)**

- ☐ Manufacturer
- ☐ Make
- ☐ Model
- ☐ Manufactured year

**Distributor(s)**

- ☐ Manufacturer
- ☐ Make
- ☐ Model
- ☐ Manufactured year

**Roller(s)**

- ☐ Manufacturer
- ☐ Make
- ☐ Model
- ☐ Manufactured year

**Sealing Plan**

- ☐ General sequence of sealing
- ☐ Widths of sealing for each pass
- ☐ Planned date for sealing to begin on contract
- ☐ Planned date for sealing to be completed on contract

**Joints**

- ☐ Procedure for construction of longitudinal joints
- ☐ Procedure for construction of transverse joints
- ☐ Procedure for starting and stopping the distributor and aggregate spreader for transverse joints

**Application Rate**

- ☐ Procedure for determining target application rates
- ☐ Procedure for measuring actual application rates
- ☐ Procedure for making adjustments to application rates

**Rolling**

- ☐ Number of rollers to be used
- ☐ Rolling procedure to assure adequate coverage
- ☐ Procedure to assure proper rolling without dislodging stone





**Brooming**

- ☐ Number of brooms to be used
- ☐ Procedure to clean surface prior to sealing
- ☐ Procedure to sweep surface after sealing, including initial, followup, and final brooming operations

**Stop Controlled Intersections**

- ☐ Procedure for controlling traffic at stop controlled intersections to minimize damage to seal.

**Opening to Traffic**

- ☐ Procedure for allowing traffic on freshly sealed surface without damage

**MATERIALS SAMPLING AND TESTING****Aggregate Properties**

- ☐ Producer name
- ☐ Producer location
- ☐ Producer approval number
- ☐ Type of material
- ☐ Procedure for sampling

**Asphalt Material**

- ☐ Producer name
- ☐ Producer location
- ☐ Producer approval number
- ☐ Type of material
- ☐ Procedure for sampling

**Temperature**

- ☐ Procedure for measuring temperature of asphalt material

**RESPONSE TO TEST RESULTS****Aggregate**

- ☐ Procedure for corrective action

**Asphalt Material**

- ☐ Procedure for corrective action

**Temperature**

- ☐ Procedure for corrective action



**DOCUMENTATION**

- ☐ Statement that Quality Control tests and documentation of equipment used on contract shall be maintained for a period of three years after completion of contract and that the location shall be readily accessible for review by the Department.

**Quality Control Tests**

- ☐ Aggregate
- ☐ Temperature
- ☐ Application Rates

**Equipment**

- ☐ Aggregate Spreader(s) used each day
  - ☐ Manufacturer
  - ☐ Model
  - ☐ Type
  - ☐ Modification
- ☐ Distributor(s) used each day
  - ☐ Manufacturer
  - ☐ Model
  - ☐ Type
  - ☐ Modification
- ☐ Roller(s) used each day
  - ☐ Manufacturer
  - ☐ Model
  - ☐ Type
  - ☐ Modification

**Daily Report**

- ☐ Route
- ☐ Date
- ☐ Air temperature at beginning of work, midday, and end of work
- ☐ Beginning and ending references
- ☐ Counter readings (beginning, ending, and total)
- ☐ Length, width, total area, aggregate quantity, emulsion quantity
- ☐ Contractor's authorized signature
- ☐ Aggregate gradations
- ☐ Aggregate delivery tickets
- ☐ Asphalt emulsion bill of lading
- ☐ Target application rate
- ☐ Applied application rate



**MICRO-SURFACING  
QUALITY CONTROL PLAN CHECKLIST**

**CONTRACT NO.** \_\_\_\_\_ **DATE** \_\_\_\_\_

**CONTRACTOR** \_\_\_\_\_

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**SIGNATURE PAGE**

- ☐ Submitted 15 days prior to placement
- ☐ QCP signed and dated by QCP Manager

**QUALITY CONTROL PERSONNEL**

**QCP Manager**

- ☐ Name
- ☐ Qualifications
- ☐ Telephone number
- ☐ Duties
- ☐ Employer

**QCP Site Manager**

- ☐ Name
- ☐ Qualifications
- ☐ Telephone number
- ☐ Duties
- ☐ Employer
- ☐\* Same person as QCP Manager

**Quality Control Technicians**

- ☐ Name
- ☐ Qualifications (INDOT Qualified Technician)
- ☐ Telephone number
- ☐ Duties
- ☐ Employer
- ☐\* Same person as QCP Manager
- ☐\* Same person as QCP Site Manager

\* Only if applicable



**PROCESS BALANCE**

- ☐ Material production established
- ☐ Appropriate support equipment
- ☐ Sufficient stockpiles/staging area
- ☐ Placement Machine speed procedure
- ☐ Placement Machine calibration procedure
- ☐ Corrective action procedure

**EQUIPMENT****Placement Machine**

Continuous Run Placement Machine \*

- ☐ Manufacturer
- ☐ Make
- ☐ Model
- ☐\* Self-Propelled

Truck Mounted Placement Machine \*

- ☐ Manufacturer
- ☐ Make
- ☐ Model

**Spreading Equipment**

Spreader Box

- ☐ Manufacturer
- ☐ Make
- ☐ Model

Rut Filling Box

- ☐ Manufacturer
- ☐ Make
- ☐ Model

Strike-Offs

- ☐ Manufacturer
- ☐ Make
- ☐ Model

Drags

- ☐ Type of Drag

**Support Equipment**

Feeder Trucks

- ☐ Manufacturer
- ☐ Make
- ☐ Model

Sweepers (Rotary Broom)

- ☐ Manufacturer
- ☐ Make
- ☐ Model

\* Only if applicable





**Ancillary Equipment**

## Front End Loader

- ☐ Manufacturer
- ☐ Make
- ☐ Model

## Screens

- ☐ Manufacturer
- ☐ Make
- ☐ Model

**PLACEMENT****Surface Preparation**

- ☐ Procedure to provide a clean and sound surface prior to placement
  - ☐ Crack Repairs
  - ☐ Full-depth repairs
  - ☐ Pavement Markings and RPM Removal
  - ☐ Sweeping/Cleaning (Number of brooms to be used)
  - ☐ Structure / Casting protection

**Placement Plan**

- ☐ General sequence of placement
- ☐ Widths and depths of placement for each course
- ☐ Planned date for placement to begin on contract
- ☐ Planned date for placement to be completed on contract
- ☐ Method of placing multiple courses (if applicable)

**Application Rate**

- ☐ Procedure for determining target application rates
- ☐ Procedure for measuring actual application rates
- ☐ Procedure for making adjustments to application rates

**Material Feed System**

- ☐ Procedure for processing mixture through placement machine

**Grade and Slope**

- ☐ Procedure for controlling grade and slope
- ☐ Procedure for placing rut-fill and level courses, if applicable

**Joints**

- ☐ Procedure for construction of longitudinal joints
- ☐ Procedure for construction of transverse joints
- ☐ Procedure for starting and stopping the machine for transverse joints

**Materials**

- ☐ Polymer Modified Asphalt Emulsion
  - ☐ Source
  - ☐ Source number
  - ☐ Type
  - ☐ Grade
- ☐ Water
  - ☐ Source



- ☐ Aggregates
  - ☐ Source
  - ☐ Source number
  - ☐ Type
  - ☐ Grade
- ☐ Portland Cement
  - ☐ Source
  - ☐ Source number
  - ☐ Type
  - ☐ Grade
- ☐ Additives
  - ☐ Source
  - ☐ Source number
  - ☐ Type
  - ☐ Grade

**Traffic Control**

- ☐ Procedure for controlling traffic at stop controlled intersections to minimize damage to new micro-surfacing
- ☐ Procedure for allowing traffic on new micro-surfacing without damage

**MATERIALS SAMPLING AND TESTING****Aggregates**

- ☐ Producer name
- ☐ Producer location
- ☐ Producer approval number
- ☐ Type of material
- ☐ Procedure for sampling and testing
- ☐ Testing frequency

**Asphalt Material**

- ☐ Producer name
- ☐ Producer location
- ☐ Producer approval number
- ☐ Type of material
- ☐ Procedure for sampling and testing
- ☐ Testing frequency

**Temperature**

- ☐ Procedure for measuring temperature of asphalt material
- ☐ Manufacturer's recommended temperature range

**Surface Quality**

- ☐ Procedure for measuring the smoothness and ride quality of the finished micro-surfacing



**RESPONSE TO TEST RESULTS****Micro-surfacing Mixture**

☐ Procedure for correction action

**Aggregates**

☐ Procedure for corrective action

**Application Rate**

☐ Procedure for corrective action

**Temperature**

☐ Procedure for corrective action

**DOCUMENTATION**

☐ Statement that Quality Control tests and documentation of equipment used on contract shall be maintained for a period of three years after completion of contract and that the location shall be readily accessible for review by the Department.

**Quality Control Tests**

☐ Mixture

☐ Temperature

☐ Smoothness

**Equipment**

☐ Placement Machine(s) used each day

☐ Manufacturer

☐ Model

☐ Type

☐ Modification

☐ Spreader Box used each day

☐ Manufacturer

☐ Model

☐ Type

☐ Modification

☐ Rut-Fill Box used each day

☐ Manufacturer

☐ Model

☐ Type

☐ Modification

☐ Strike-Offs used each day

☐ Manufacturer

☐ Model

☐ Type

☐ Modification

☐ Drags used each day

☐ Manufacturer

☐ Type

☐ Modification



- ☐ Feeder Truck(s) used each day
  - ☐ Manufacturer
  - ☐ Model
  - ☐ Type
  - ☐ Modification
- ☐ Sweeper(s) used each day
  - ☐ Manufacturer
  - ☐ Model
  - ☐ Type
  - ☐ Modification
- ☐ Front End Loader(s) used each day
  - ☐ Manufacturer
  - ☐ Model
  - ☐ Type
  - ☐ Modification
- ☐ Screen(s) used each day
  - ☐ Manufacturer
  - ☐ Model
  - ☐ Type
  - ☐ Modification

**Daily Report**

- ☐ Control section
- ☐ Job number
- ☐ Route
- ☐ Date
- ☐ Air temperature
- ☐ Control settings (calibration values, unit weight of emulsion, and percent residue of emulsion)
- ☐ Beginning and ending intervals
- ☐ Counter readings (beginning, ending, and total)
- ☐ Length, width, total area, aggregate quantity, emulsion quantity
- ☐ Percent of each material, percent of asphalt cement, application rate, combined application rate
- ☐ Contractor's authorized signature
- ☐ Aggregate gradations
- ☐ Aggregate delivery tickets
- ☐ Asphalt emulsion bill of lading
- ☐ Sand equivalent value
- ☐ Theoretical application rate (not applicable to rut fill course)
- ☐ Yield





**TRENCHLESS PIPE INSTALLATION  
QUALITY CONTROL PLAN CHECKLIST****CONTRACT NO.** \_\_\_\_\_ **DATE** \_\_\_\_\_**CONTRACTOR** \_\_\_\_\_**SIGNATURE PAGE**

- ☐ Submitted 15 days prior to commencing work
- ☐ QCP signed and dated by QCP Manager

**QUALITY CONTROL PERSONNEL****QCP Manager**

- ☐ Name
- ☐ Trenchless pipe installation work experience
- ☐ Telephone number
- ☐ Duties
- ☐ Employer

**QCP Site Manager**

- ☐ Name
- ☐ Trenchless pipe installation work experience
- ☐ Telephone number
- ☐ Duties
- ☐ Employer
- ☐\* Same person as QCP Manager

**CALCULATIONS**

- ☐ Design calculations of pipe to be installed by jacking
- ☐ Calculations demonstrate that pipe is of sufficient strength to resist maximum jacking forces without damage to pipe
- ☐ Detail drawings of pipe to be installed by jacking

**INSTALLATION PLANS**

- ☐ 11in. x 17in. or larger paper
- ☐ Location of jacking or boring pits
- ☐ Dimensions of jacking or boring pits
- ☐ Elevations of jacking or boring pits
- ☐ Right-of-way lines shown
- ☐ Edge of pavement shown
- ☐ Existing pipe structures shown
- ☐\* Existing utilities shown
- ☐\* Potential obstructions shown

\* Only if applicable



**METHODS**

- ☐ Description of methods for controlling the line and grade
- ☐\* Description of method for grouting annular space between bored hole and carrier pipe
- ☐\* Description of method for grouting annular space between casing pipe and carrier pipe
- ☐\* Plan for penetrating, removing, or otherwise managing obstructions
- ☐\* Plan for dewatering, including the method of controlling erosion and sediment from dewatering operations
- ☐ Plan for ensuring that all voids created by installation operations are filled in a timely manner
- ☐ Plan for monitoring surface settlement or heave, including the response plan for unacceptable settlement or heave

**MATERIALS – Sources of materials for each pipe structure**

- ☐ Casing pipe (if separate from carrier pipe)
- ☐ Carrier pipe
- ☐ Grout
- ☐ Bentonite or other lubricants
- ☐ Slurry mixes

**EQUIPMENT**

- ☐ Each piece of equipment used for each pipe structure
- ☐ Statement that the equipment manufacturer's operation manuals shall be provided upon request

\* Only if applicable